



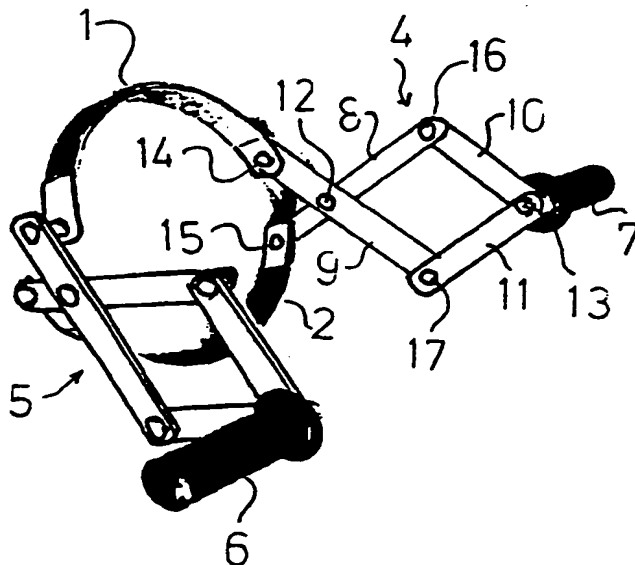
INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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<p>(21) International Application Number: PCT/SE96/01072</p> <p>(22) International Filing Date: 29 August 1996 (29.08.96)</p> <p>(30) Priority Data: 9502992-2 30 August 1995 (30.08.95) SE</p> <p>(71) Applicant (for all designated States except US): NORRAHAMMARS PLÅTSLAGERI AB [SE/SE]; Västra Källängsvägen 14, S-562 32 Norrahammar (SE).</p> <p>(72) Inventors; and (75) Inventors/Applicants (for US only): SANBERG, Terje [SE/SE]; Vändgatan 5, S-562 31 Norrahammar (SE). SANDBERG, Stein [SE/SE]; Bergholmsvägen 17, S-562 30 Norrahammar (SE).</p> <p>(74) Agent: ARWIDI, Bengt; Ahlpatent AB, Förborgsgatan 27, S-554 39 Jönköping (SE).</p>	<p>(81) Designated States: CA, CN, CZ, JP, NO, PL, RU, SG, US, European patent (AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE).</p> <p>Published <i>With international search report.</i> <i>With amended claims.</i> <i>In English translation (filed in Swedish).</i></p>	

(54) Title: **LIFTING AND CARRYING DEVICE**

(57) Abstract

The present invention is for a lifting and carrying device for gas bottles and the like which due to their shape and weight are difficult to lift and move without lifting equipment. The device shown in the figure includes two gripping means (1, 2), which are connected to each other by two identical linking systems (4, 5). In the far end from the gripping devices of the linking system there are two handles (6, 7). The link system, which comprises torque links are so arranged that the gripping devices (1, 2) are displaced parallel relative to each other when the handles (6, 7) are moved in a direction at right angle to a plane through the gripping devices, i.e. the handles in practice are moved upwards or downwards in order to open or close respectively the gripping device.

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LIFTING AND CARRYING DEVICE

The present invention is for a lifting and carrying device for gas bottles and the like which due to their shape and weight are difficult to lift and move without lifting equipment. The invention is primarily intended to be used by manual lifting and short distance movements, for example within a workshop or working place.

The moving of gas bottles in these cases can take place in different ways. The bottles which are shaped as circular cylinders may be tilted and rolled on the edge around their bottom. They may also be moved by means of different kinds of transportation carts. The handling requirements due to security and other reasons, however, make it unsuitable or unallowed to roll the bottles when they are in a down-laying position. Also the above mentioned means of transportation are unsuitable, risky or bring with them difficulties, for example when passing thresholds and staircases and from an ergonomic point of view.

One means for lifting and moving gas bottles is described in US 3,960,398. The means, which comprises two members which are linked together, must be exactly adapted to the size of the gas bottle onto which it is to be used. The design of this device is also such that the surface of contact between the lifting device and the gas bottle will be very small and only comprise two short edges of the lifting device. This brings with it disadvantages both by a very high load on the device and the gas bottle in the contact surfaces and by the risk that the bottle due to its weight or some movement in connection with lifting and transportation will slip in the carrying device.

The objective of the present invention is a lifting device for gas bottles and the like, by means of which these can be lifted and moved manually by one person only. A further object of the invention is a device which is flexible relative to the size of the bottles and which gives safe lifting thereby that the

lifting force from the device is transferred to the gas bottle through a comparatively large contact surface so that the risk for slipping in the carrying device is eliminated.

The invention will below be described more in detail with reference to the example of an embodiment which is shown in the enclosed figures.

Figure 1 shows a lifting device according to the invention.

Figure 2 shows a lifting device according to the invention applied to the upper part of a gas bottle.

The device shown in figure 1 includes two gripping means 1, 2, which are connected to each other by two identical linking systems 4, 5. In the far end from the gripping devices of the linking system there are two handles 6, 7. The link system which comprises torque links are so arranged that the gripping devices 1, 2 are displaced parallel relative to each other when the handles 6, 7 are moved in a direction at right angle to a plane through the gripping devices, i.e. the handles in practice are moved upwards or downwards in order to open respectively close the gripping device. Each link system has two lower link arms 8, 9 and two upper link arms 10, 11. The lower link members are movably connected to either of the two gripping devices by means of movable pivot links constituted by pins 14, 15. The lower links are also movably connected to each other at a pivot 12 and with the upper link members 10, 11 at pivots 16, 17. The upper link members 10, 11 are further movably connected to each other at a pivot 13 which suitably is the outer end of a shaft which includes the handle 7.

In use the device is applied to a gas bottle 3 as shown in figure 2. The gripping devices are positioned at a suitable height for lifting and moving the gas bottle. When the handles 6, 7 are moved upwards, the gripping devices 1, 2 are actuated by the linking system and moved towards each other.

The gripping devices, which are suitably made from steel bands having a friction increasing surface coating, have some flexibility and adapt to the shape of a gas bottle. Thereby that the gripping devices by individual links 14, 15 are connected into a torque link they clamp the bottle so that the largest possible contact surface is obtained instead of taking an angular position and pressing an edge onto the bottle. When the upwards movement of the handles continues, the gripping devices press stronger against the bottle and safe grip without risk for slipping is obtained. Clamped in this way the gas bottle can now be lifted and moved by one person.

It is essential that the handles when lifting are at a correct distance above the gripping devices and the torque links should be designed with this in mind. The object to be lifted shall be possible to support with the body of the person who is lifting. If the distance between the gripping device and the handles is too long or too short, there is an increased risk that the lifted object will tilt to the side, either because the lever arm between the handles and the gripping device is too short or because the gripping devices will be positioned too far down on the object. The distance between a line through the two handles and a plane through the middle of the gripping devices should be 150 - 400 mm, preferably about 250 mm.

In exceptional cases at very heavy gas bottles and other objects two persons may use the device together. In such cases a slanted or uneven distribution of the lifting force onto the two handles may occur, which, however, does not mean any risk that the gas bottle will slip in the gripping device, as the design thereof ensures that sufficient friction is always present between the gripping device and the gas bottle.

Within the frame of the inventive idea the embodiment of the invention may be varied in different ways. The gripping devices which in the example above are made from steel bands can be given different kinds of surface coating, for example by

rubber, polyethylene or the like. In embodiments without any surface coating the surface may be knurled or treated in any other way. The steel bands may be substituted for by chains or wires of corresponding length. Also the linkage system can be designed in different ways as to the relative length of the links of each system and position of the pivots, especially the pivot 12 which connects the two lower links. Further one more link may be added which can extend from the upper connecting point 13 of the two upper links and at its other end carry the handles. The gripping devices can also have different means to support or control the objects which shall be lifted and moved.

CLAIMS

- 1) Lifting and carrying device for gas bottles and the like objects (3), characterized therein, that it comprises two opposite gripping devices (1, 2) for gripping the object (3), devices (4) for parallel displacement of the gripping devices and handles (6, 7) mounted thereon, whereby the handles are so mounted that when they are actuated by a lifting force the gripping devices are moved towards each other.
- 2) Device according to claim 1, characterized therein, that the gripping devices are flexible so that they adapt to the shape of the object which shall be lifted.
- 3) Device according to any of the preceding claims, characterized therein, that the device for parallel displacement of the gripping devices is torque links.
- 4) Device according to any of the preceding claims, characterized therein, that the surface of the gripping device which contacts the object to be lifted has friction increasing coating.
- 5) Device according to any of the preceding claims, characterized therein, that the distance between the handles (6, 7) and the gripping device is 150 - 400 mm, preferably about 250 mm.

AMENDED CLAIMS

[received by the International Bureau on 28 January 1997 (28.01.97);
original claims 1-5 replaced by new claims 1 and 2 (1 page)]

- 1) Lifting and carrying device for gas bottles and the like objects (3) in a vertical position, comprising two opposite gripping devices (1, 2) for gripping the object (3), devices (4) for parallel displacement of the gripping devices and handles (6, 7) mounted thereon, whereby the handles are so mounted that when they are actuated by a lifting force the gripping devices are moved towards each other, characterized therein, that the device for parallel displacement of the gripping devices is torque links and that the gripping devices are flexible so that they adapt to the shape of the object which shall be lifted.
- 2) Device according to claim 1, characterized therein, that the distance between the handles (6, 7) and the gripping device is 150 - 400 mm, preferably about 250 mm.

AMENDED SHEET (ARTICLE 19)

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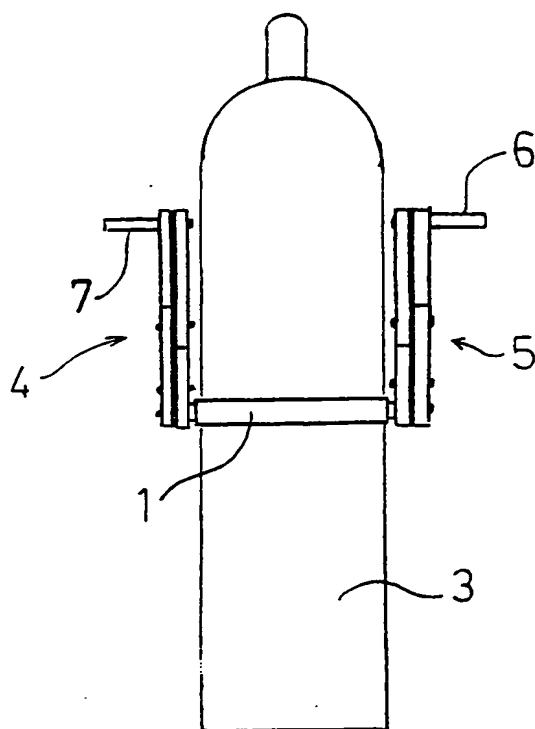


Fig 2

INTERNATIONAL SEARCH REPORT

International application No.

PCT/SE 96/01072

A. CLASSIFICATION OF SUBJECT MATTER

IPC6: B65G 7/12, B66C 1/44

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC6: B65G, B66C

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

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C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	SE 464021 B (ARTIC NOVA AB FÖRETAGARCENTRUM), 25 February 1991 (25.02.91), figure 1, claims 1-3, 5 --	1-4
X	Derwent's abstract, No H-2926C /34, week H34, ABSTRACT OF SU, 491146 (VOROBV D D), 9 January 1980 (09.01.80) --	1-4
A	DK 2598/89 A (KAI BÖRSTING PEDERSEN), 27 November 1990 (27.11.90), figures 1,2 --	1-4
A	DE 1756613 A1 (HOLM, OTTO), 22 October 1970 (22.10.70), figures 1,2, claims 1-6 --	1-4

☒ Further documents are listed in the continuation of Box C.
 ☒ See patent family annex.

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Date of the actual completion of the international search

13 November 1996

Date of mailing of the international search report

05-12-1996

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C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 911996 A (P.O. KAFFKE), 9 February 1909 (09.02.09), column 2, line 77 - line 90, figures 1-4 --	1-4
A	DE 1506525 B1 (ADOLF LANGHAMMER KG, MASCHINENFABRIK), 24 July 1969 (24.07.69), figures 1-6, claims 1-5 -- -----	1-4

INTERNATIONAL SEARCH REPORT
Information on patent family members

28/10/96

International application No.
PCT/SE 96/01072

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
SE-B-	464021	25/02/91	SE-A- 8701802	31/10/88
DK-A-	2598/89	27/11/90	NONE	
DE-A1-	1756613	22/10/70	NONE	
US-A-	911996	09/02/09	NONE	
DE-B1-	1506525	24/07/69	NONE	

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